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Decision making with multimorbidity patients in primary care: protocol of a systematic review and thematic synthesis of qualitative research.

This systematic review protocol was registered with the International Prospective Register of Systematic Reviews (PROSPERO) with ID 91978

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Contributions: DSR is the guarantor. DSR conceived the review and led the drafting of the protocol. BH assisted with framing the research question and approach. AA contributed to the methodological approach. All authors critically revised it for important intellectual content. All authors approved the final version of the manuscript.

Amendments

In the event of protocol amendments, the date of each amendment will be accompanied by a description of the change and the rationale.

Support

This systematic review is supported by the authors and no funding was attributed. This work is part of DSR PhD program.

Abstract

Introduction:

Good patient outcomes correlate with physicians' capacity of good clinical judgement. Multimorbidity is common, it increases uncertainty and complexity in the clinical encounter but health-care systems and medical education are centred on individual diseases. This context turns patient-centeredness and decision making process even more difficult.

Research in clinical reasoning and medical decision in real world context is needed, particularly concerning the way doctors think and their cognitive and affective biases. The aim of the present review is to identify and synthesize available qualitative evidence on doctors' perspectives, experiences and barriers during the process of decision making with multimorbidity patients in primary care.

Methods and analysis:

Systematic review of qualitative research. PubMed, CINAHL, PsycINFO, Embase and Web of Science will be searched, supplemented with manual searches of reference lists of included studies. Qualitative studies published in Portuguese, Spanish and English language will be included, with no date limit. Studies will be eligible when they evaluate family physicians' perspectives, opinions or perceptions on decision making for patients with multimorbidity in primary care. Methodological quality of studies selected for retrieval will be assessed by two independent reviewers before inclusion in the review using the CASP tool. Thematic synthesis will be used to identify key categories and themes from the qualitative data. The Confidence in the Evidence from Reviews of Qualitative research approach will be used to assess how much confidence to place in findings from the qualitative evidence synthesis.

Ethics and dissemination:

This review will use published data. No ethical issues are foreseen. Findings will be disseminated to the medical community via journal publication and conference presentation(s).

Prospero registration number: 91978

Keywords:

Decision-making; multimorbidity; primary care

Strengths and limitations of this study

Strenghts:

- Systematic review of physicians' perceptions on forces that play a role on decisions they make with patients with multimorbidity.
- Focus on decision-making processes and dysrationality-promoting factors.
- Potential to impact health practice and policy by identifying the main barriers and promotors of good decision making in primary care with multimorbidity patients

Limitations:

- Limited to primary care physicians and patients with multimorbidity

Introduction

Rationale

Research reveals that the quality of medical decision making is highly related with patient safety and reports state that bad clinical decisions lead to considerable morbidity and mortality.(1). Medical decisions are at the core of the clinical encounter and good patient outcomes correlate with physician's capacity of good clinical judgement.(2,3).

The paradoxical reality of primary care

In primary care, patients with multiple chronic disease are the rule and not the exception.(4–6) Despite the actual predominance of multiple chronic conditions, medical care remains centered in the diagnosis and treatment of single diseases.(7) Medicine moved into an era of accountability, scrutiny, measurement, pay for performance and market based principles.(8) While this movement aimed to increase quality, it reinforces fragmentation and disease centered health care and turns the holistic, integrated and person centered decision making a difficult goal to accomplish.(9)

Patients with multimorbidity have complex needs that challenge evidence based medical decision and not surprisingly generalist specialties are the ones most prone to erroneous medical decision.(10)(11) First, for many years medical research excluded patients with multimorbidity from clinical trials.(12) This undermines and generates uncertainty and doubt in clinical decision with these patients.(13) Second, quality is defined by clinical-practice guidelines written by authoritative speciality organizations which aim to improve medical care but tend to focus in a single organ or system and it's not clear how physicians estimate benefits and harms when applying them to patients with multimorbidity.(14) Third, a complex web of positive (e.g. accreditation, pay-for-performance) or negative reinforcement (e.g. administrative sanctions or loss of income) are built around disease-specific quality indicators. Fourth, productivity is measured by number of clinical contacts or medical procedures per unit of time decreasing consultation times (15). All these mechanisms produce a primary care clinical encounter surrounded by high levels of uncertainty, complexity and a particularly demanding medical decision-making context.(16) Qualitative research confirms that physicians feel unconfident with the applicability of guidelines recommendations. They perceive that guidelines ignore contextual variables, seldom consider multimorbidity, socio-personal context and patient preferences, and ultimately not considered useful because they add to the complexity of real world decision making.(17,18) In summary, multimorbidity is ever more common and challeges physicians with increased uncertainty and complexity. Yet, health care systems have evolved towards a fragmented, single-disease care, failing to answer to this epidemiological transition.(19) This is the paradoxical reality of primary care under which health care decisions are made. A reality that needs better tools to help physicians to make optimal decision making in patients with multimorbidity.

The theoretical framework of medical decision making

Cognitive psychology's most consensual and known model for human decision making is the *dual process theory*.(20) This model states that decision making is the result of the integration between two cognitive systems. System 1 or *intuitive approach* is experiential

and works based on fast and frugal heuristics and pattern recognition that triggers an automated mode of thinking.(21) System 2 or *analytical approach* is characterized for being a deliberated, slower and rational thinking process. Under this system people use deductive reasoning to test hypothesis and solve problems. (21,22) This theory has been applied in clinical decision making, underlining the relevance of physicians' intuition and the high-level interactions between analytical and non-analytical processes(23) and proposing clinical reasoning and decision making as the result of a permanent interaction between the two systems.(22)

Croskerry defined optimal medical decision making as the one that is *logical, evidence based, follows the laws of science and probability and lead to decisions that are consistent with rational choice theory*.(3) But this outcome is not possible in most situations mainly due to *dysrationalia* in decision making which means that different types of cognitive bias compromise rationality when making decisions.(3) Cognitive psychology research has shown that people tend to use simple strategies and seek good enough solutions that make sense in their environment in what Gigerenzer called *ecological rationality*.(24,25) This heuristic or *intuitive approach* can be highly economical and effective. However, it has long been pointed a source of cognitive bias, particularly when facing complexity and uncertainty. (26) As such, its results may not always lead to the best decision to patients. Cognitive biases have been poorly studied in medicine, to the authors knowledge has not been done in the primary care setting, and its' better understanding could improve decisions in situations of uncertainty.(26)

Multimorbidity is an interesting condition to explore how physicians use system 1 and system 2 in their decisions, in which decisions intuitive approaches work and in which dysrationality may hinder the best decision to patients.

The need for real world research

Research in clinical reasoning and medical decision in real world context is needed, particularly with experienced physicians and how to embrace primary care uncertainty.(11,16,22,23,27–29) This research is particularly demanding in a chronic diseases context. Outcomes are not immediate and, in many circumstances, have to be defined case to case as in the complex or frail patient, turning decision awareness and self-evaluation difficult tasks for the clinician.

In primary care, qualitative research on decision making with multimorbidity patients has explored physicians' perspectives on patient management (30), organizational issues (31) and prescribing decisions (10). To our knowledge, no review compiled information regarding the way clinician's think and decision making *dysrationalia* promoting factors. To improve our good clinical judgement by turning it more rational but at the same time tailored to each patient unique characteristics we need to better understand the way we think and the way our cognitive and affective biases affect each of our medical decisions.

Objectives

The aim of the present review is to identify and synthesize available qualitative evidence about primary care physician decision-making processes when attending patients with multimorbidity.

The main research question under study is the following:
According to available qualitative research, which information do primary care physicians perceive to contribute for better decision-making with patients with multimorbidity and which are the main barriers in this process?

Methods

Preferred reporting items for systematic review and meta-analysis protocol (PRISMA P) guidelines were followed to elaborate this protocol.(32) See Additional file 1 for PRISMA-P checklist application on this protocol.
A thematic synthesis approach will be used to allow identification of key categories and themes from the qualitative data. This method aims to generate descriptive themes from line-by-line coding and translation of concepts from one study to another, as well as analytical themes, allowing new insights and interpretations beyond the content of the original studies.(33)(34)

Eligibility criteria

Types of studies

The current review will consider qualitative research studies. This includes any study that uses qualitative methods for data collection such as interviews (individual and focus group), observation as well as qualitative methods for data analysis such as thematic analysis. Mixed -methods studies will be considered if the applied qualitative methodology was as previously described.

Types of participants

The review will consider qualitative studies enrolling GP/primary care physicians/ family physicians.

Context and phenomena of interest

The context of the studies is primary care and the review will include studies that evaluate family physicians' perspectives/ opinions/ perceptions on decision making concerning the management of multimorbidity patients.

Information sources

Databases to be searched include PubMed, CINAHL, PsycINFO, Embase and Web of Science. The search for unpublished studies will include ProQuest Dissertations and Theses. We aim to find both published and unpublished studies.

We will also search other resources such as the reference list of included studies, grey literature including government or non-governmental organisation reports. Original study authors will be contacted for clarification if needed.

Search Strategy

We will include studies published in Portuguese, Spanish and English language (due to limited funding for translators) and there will be no date limit. Since decision making has been studied for decades, this broad timeframe will ensure that all relevant studies on this topic are included in the systematic review.
The search strategy is presented in Additional file 2.

Study Records

Data management

Study screening and selection will be conducted using Mendeley Ltd. software and Google Spreadsheets.

Selection process

Two authors (DSR and PS) will independently screen titles and read the abstracts for papers with relevant titles. Full papers will be retrieved for papers with relevant abstracts and reviewed by the two researchers. Full text of potentially eligible articles will be screened for inclusion in the review by DSR and NB. Disagreements will be resolved by discussion and consensus or with a third author (BH). Reasons for exclusion of studies in this last screening stage will be recorded, tabulated and published with the final paper.

Data collection process

DSR and NB will consider and collect all of the text labelled as findings/results and discussion/conclusions/interpretations. in the original study reports selected for inclusion in the review.(33) Data will be extracted verbatim from study papers directly into NVivo-11 software (QSR International).

Data items

For each of the included study the following additional information will be collected by DSR: authors; title; year(s) of data collection; year of publication; study population; phenomena of interest; study setting; study country; theoretical framework; data collection method used (eg. interviews, focus groups, document analysis, etc.). NB will assess original studies for confirmation. Disagreements will be resolved by discussion and consensus or with a third author (BH). These data will be recorded, tabulated and published with the final paper.

Outcomes and Synthesis strategy

Data will be analyzed according to established guidelines on thematic synthesis.(33) This method consists in a three steps approach to the synthesis of qualitative data. First, the results from qualitative studies will be coded line-by-line according to content and meaning. This process will require re-reading and recoding, as well as discussion between the research team to determine the need for new codes or collapsing of existing ones. After this

step, the construction of descriptive themes will be based on the translation of concepts from one study to another, which means recognizing the same concepts across studies, and in the development of a hierarchical coding structure based on the similarities and differences between the codes.
The third stage of thematic synthesis, as described by Thomas et al.(33) implies an iterative analysis of the result of stage 1 and 2 generating new themes that emerge transversally to all review studies. This last step of thematic synthesis goes beyond the content of the original studies, with new concepts and understandings emerging from the descriptive themes being organized into analytical themes.

This process will be carried by DSR and NB consulting the research team. At this point, interpretations of information and barriers themes that primary care physicians value when making decisions with multi morbid patients will emerge. Al these stages of data synthesis will be recorded in NVivo-11 to allow for an auditable track.
The findings will be presented in a narrative form, where textual pooling is not possible.

Risk of bias in individual studies

Methodological quality of studies selected for retrieval will be assessed by two independent reviewers (DSR and NB) before inclusion in the review using the CASP tool.(35) Any disagreements that arise between the reviewers will be resolved through discussion, or with a third reviewer (AA).

Confidence in cumulative evidence

The Confidence in the Evidence from Reviews of Qualitative research (CERQual) approach will be used to assess how much confidence to place in findings from the qualitative evidence synthesis.(36) This assessment of *confidence* in the review findings is based on four components: the *methodological limitations* of the qualitative studies contributing to a review finding; the *relevance* to the review question of the studies contributing to a review finding; the *coherence* of the review finding, and the *adequacy* of data supporting a review finding.(36) Findings will be classified as having *high, moderate, low* or *very low* confidence.
DSR and NB will independently apply the CERQual tool to the review findings.
Disagreements will be resolved by discussion and consensus. If disagreements persist, a third author (BH) will consulted. CERQual Qualitative Evidence Profiles and Summary of Qualitative Findings table will be recorded and published with the final paper.

Reporting

This protocol was created using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA)-P Statement for reporting systematic review protocols.(32)
The qualitative systematic review study report will follow the Enhancing Transparency in Reporting the synthesis of Qualitative research (ENTREQ) statement for reporting syntheses of qualitative studies.(37)

Discussion

Research in clinical reasoning and medical decision in real world context is needed, particularly with experienced physicians (11,22,23,27–29) This review will add knowledge by characterizing better physicians' perceptions about what forces play a role when they make decisions. It will focus on decision-making processes and dysrationality-promoting factors. This different "lens" will allow us to supplement existing systematic reviews of qualitative research about multimorbidity, which so far have mostly focused on organizational issues.

We have reasons to believe that the main flaws in decision making likely reside in the way physicians think, rather than in clinical knowledge deficits. For example, one can predict that, among other *dysrationalia* promotors, the tendency to avoid the complexity of multimorbidity may play a significant role. This systematic review will provide evidence that will support or contradict or hypothesis.

If our hypothesis holds true, it will then have the potential to impact health practice and policy by identifying the main barriers and promotors of good decision making in primary care with multimorbidity patients. The results may allow the improvement of knowledge transference strategies or the creation of new ones. Ultimately, they will be useful for informing practice physicians; creating tools that can help decision-making; improving medical education; further academic research and for private industry or public health policy decision-makers.

Additional Files

Additional file 1 – Search Strategy

Abbreviations

Author's contributions

DSR is the guarantor. DSR conceived the review and led the drafting of the protocol. BH and IS assisted with framing the research question and objectives and contributed to the drafting and revision of the protocol. AA assisted with planning the methodological approach and contributed to the drafting and revision of the protocol. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

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Additional file 2 – PRISMA-P 2015 Checklist

This checklist has been adapted for use with protocol submissions to *Systematic Reviews* from Table 3 in Moher D et al: Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic Reviews* 2015 **4**:1

Section/topic	#	Checklist item	Information reported		Line number(s)
			Yes	No	
ADMINISTRATIVE INFORMATION					
Title					
Identification	1a	Identify the report as a protocol of a systematic review	☒	☐	3
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	☐	☒	
Registration	2	If registered, provide the name of the registry (e.g., PROSPERO) and registration number in the Abstract	☒	☐	6
Authors					
Contact	3a	Provide name, institutional affiliation, and e-mail address of all protocol authors; provide physical mailing address of corresponding author	☒	☐	11
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	☒	☐	21
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	☐	☒	
Support					
Sources	5a	Indicate sources of financial or other support for the review	☒	☐	30
Sponsor	5b	Provide name for the review funder and/or sponsor	☒	☐	344
Role of sponsor/funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	☐	☒	NA
INTRODUCTION					
Rationale	6	Describe the rationale for the review in the context of what is already known	☒	☐	78
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to	☒	☐	168

Section/topic	#	Checklist item	Information reported		Line number(s)
			Yes	No	
		participants, interventions, comparators, and outcomes (PICO)			
METHODS					
Eligibility criteria	8	Specify the study characteristics (e.g., PICO, study design, setting, time frame) and report characteristics (e.g., years considered, language, publication status) to be used as criteria for eligibility for the review	☒	☐	184
Information sources	9	Describe all intended information sources (e.g., electronic databases, contact with study authors, trial registers, or other grey literature sources) with planned dates of coverage	☒	☐	199
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	☒	☐	207
STUDY RECORDS					
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	☒	☐	215
Selection process	11b	State the process that will be used for selecting studies (e.g., two independent reviewers) through each phase of the review (i.e., screening, eligibility, and inclusion in meta-analysis)	☒	☐	218
Data collection process	11c	Describe planned method of extracting data from reports (e.g., piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	☒	☐	226
Data items	12	List and define all variables for which data will be sought (e.g., PICO items, funding sources), any pre-planned data assumptions and simplifications	☒	☐	232
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	☐	☐	240
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	☐	☐	262
DATA					
Synthesis	15a	Describe criteria under which study data will be quantitatively synthesized	☐	☒	NA
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data, and methods of combining data from studies, including any planned exploration of consistency (e.g., I^2, Kendall's tau)	☐	☒	NA
	15c	Describe any proposed additional analyses (e.g., sensitivity or subgroup analyses, meta-regression)	☐	☒	NA

Section/topic	#	Checklist item	Information reported		Line number(s)
			Yes	No	
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	☒	☐	241
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (e.g., publication bias across studies, selective reporting within studies)	☐	☒	NA
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (e.g., GRADE)	☒	☐	269

Additional File 1 – Search Strategy

Additional File 1 – Search strings

Electronic bibliographic databases and platforms

1.1. Search strategy for MEDLINE (via PubMED interface)

#1 (Comorbidity [MeSH Terms, exp all trees]) OR ("Multiple Chronic Conditions" [MeSH Terms, exp all trees])

#2 ("Decision Making" [MeSH Terms, exp all trees]) OR ("Medical Records" [MeSH Terms, exp all trees]) OR ("Information Seeking Behavior" [MeSH Terms, exp all trees])

#3 ("Primary Health Care" [MeSH Terms, exp all trees]) OR ("General Practitioners" [MeSH Terms, exp all trees]) OR (Physicians [MeSH Terms, exp all trees])

#4 interview [ti,ab] OR "focus group" [ti,ab] OR "qualitative study" [ti,ab] OR "qualitative research" [ti,ab]

#5 multimorbidit* [mp] OR "multi morbidit*" [mp] OR multi-morbidit* [mp]

#6 (Comorbidity [MeSH Terms, exp all trees]) OR ("Multiple Chronic Conditions" [MeSH Terms, exp all trees]) OR (multimorbidit* [mp] OR "multi morbidit*" [mp] OR multi-morbidit* [mp])

#7 #2 AND #3 AND #4 AND #6

1.2. Search strategy for Web of Science (via B-ON interface)

#1 (comorbidity).kw OR (multiple chronic conditions).kw

#2 (decision making).kw OR (medical records).kw OR (information seeking behavior).kw

#3 (primary health care).kw OR (general practitioners).kw OR (physicians).kw

#4 (interview).ti OR (focus group).ti OR (qualitative study).ti OR (qualitative research).ti

#5 (multimorbidit*).ti OR (multi morbidit*).ti OR (multi-morbidit*).ti

#6 #1 AND #2 AND #3 AND #4 AND #5

#7 #1 OR #5

#8 #2 AND #3 AND #4 AND #7

Additional File 1 – Search Strategy

1.3. Search strategy for SCOPUS

URL: http://www.scopus.com, using all types of documents and published until present.

#1	(decision making).ti,abs,key OR (medical records).ti,abs,key OR (information seeking behavior).ti,abs,key
#3	(primary health care).ti,abs,key OR (general practitioners).ti,abs,key OR (physicians).ti,abs,key
#4	(interview).ti,abs,key OR (focus group).ti,abs,key OR (qualitative study).ti,abs,key OR (qualitative research).ti,abs,key
#5	(comorbidity).ti,abs,key OR (multiple chronic conditions).ti,abs,key OR (multimorbidit*).ti,abs,key OR (multi morbidit*).ti,abs,key OR (multi-morbidit*).ti,abs,key
#6	doctype.ar OR doctype.ip
#7	#1 AND #2 AND #3 AND #4 AND #5 #6

1.4. Search strategy for EMBASE (via OVID interface)

#1	comorbidity.mp
#2	multiple chronic conditions.mp
#3	1 or 2
#4	decision making.mp
#5	medical records.mp
#6	4 or 5
#7	primary health care.mp
#8	general practitioners.mp
#9	physicians.mp
#10	7 or 8 or 9
#11	focus group.mp
#12	interview.mp
#13	qualitative study.mp
#14	qualitative research.mp
#15	11 or 12 or 13 or 14
#16	multimorbidity.mp
#17	3 or 16
#18	6 and 10 and 15 and 17

Additional File 1 – Search Strategy

1.5. Search strategy for PsychINFO (via American Psychological Association interface)

#1 (comorbidity).kw OR (multiple chronic conditions).kw

#2 (decision making).kw OR (medical records).kw OR (information seeking behavior).kw

#3 (primary health care).kw OR (general practitioners).kw OR (physicians).kw

#4 (interview).tx OR (focus group).tx OR (qualitative study).tx OR (qualitative research).tx

#5 (interview).ti OR (focus group).ti OR (qualitative study).ti OR (qualitative research).ti

#6 (multimorbidit*).tx OR (multi morbidit*).tx OR (multi-morbidit*).tx

#7 #1 OR #6

#8 (#1 OR #6) AND (#2 AND #3 AND #4 AND #7)

#9 (#1 OR #6) AND (#2 AND #3 AND #4 AND #7) AND (#2 AND #3 AND #5 AND #7)

1.6. Search strategy for CINAHL (via EBSCO interface)

#1 (comorbidity).kw OR (multiple chronic conditions).kw

#2 (decision making).kw OR (medical records).kw OR (information seeking behavior).kw

#3 (primary health care).kw OR (general practitioners).kw OR (physicians).kw

#4 (interview).ti OR (focus group).ti OR (qualitative study).ti OR (qualitative research).ti

#5 (multimorbidit*).tx OR (multi morbidit*).tx OR (multi-morbidit*).tx

#6 #1 OR #5

#7 (#2 AND #3 AND #4 AND #6)

#8 (interview).tx OR (focus group).tx OR (qualitative study).tx OR (qualitative research).tx

#9 (#2 AND #3 AND #6 AND #8)

1.7. Search strategy for ProQuest Dissertations & Theses Global (via ProQuest interface)

#1 su.(comorbidity) OR multimorbidity

#2 su.(decision making) OR su(information seeking behavior)

#3 su(general practitioners) OR su(physicians)

#4 interview OR (focus group) OR (qualitative study) OR (qualitative research)

#5 #1 AND #2 AND #3 AND #4

BMJ Open

Primary care physicians' decision-making processes in the context of multimorbidity: protocol of a systematic review and thematic synthesis of qualitative research.

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Primary Subject Heading:	Qualitative research
Secondary Subject Heading:	General practice / Family practice, Medical education and training, Evidence based practice
Keywords:	decision making, multimorbidity, QUALITATIVE RESEARCH, PRIMARY CARE

Primary care physicians' decision-making processes in the context of multimorbidity: protocol of a systematic review and thematic synthesis of qualitative research.

This systematic review protocol was registered with the International Prospective Register of Systematic Reviews (PROSPERO) with ID 91978.

Authors:

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4 - APPsyCI – Applied Psychology Research Center Capabilities & Inclusion, ISPA – University Institute, Portugal.

Contributions: DSR is the guarantor. DSR conceived the review and led the drafting of the protocol. BH and IS assisted with framing the research question and objectives and contributed to the drafting and revision of the protocol. PS and NB contributed to the drafting and revision of the protocol. AA assisted with planning the methodological approach and contributed to the drafting and revision of the protocol. MAA assisted with the search strategy and contributed to the drafting and revision of the protocol. All authors read and approved the final manuscript.

Amendments

In the event of protocol amendments, the date of each amendment will be accompanied by a description of the change and the rationale.

Support

This systematic review is supported by the authors and no funding was attributed. This work is part of DSR's PhD program.

Abstract

Introduction:

Good patient outcomes correlate with the physicians' capacity for good clinical judgement. Multimorbidity is common and it increases uncertainty and complexity in the clinical encounter. However, health-care systems and medical education are centred on individual diseases. In consequence, recognition of the patient as the centre of the decision-making process becomes even more difficult. Research in clinical reasoning and medical decision in a real world context is needed. The aim of the present review is to identify and synthesize available qualitative evidence on primary care physicians' perspectives, views or experiences on the process of decision-making with multimorbidity patients.

Methods and analysis:

This will be a systematic review of qualitative research where PubMed, CINAHL, PsycINFO, Embase and Web of Science will be searched, supplemented with manual searches of reference lists of included studies. Qualitative studies published in Portuguese, Spanish and English language will be included, with no date limit. Studies will be eligible when they evaluate family physicians' perspectives, opinions or perceptions on decision making for patients with multimorbidity in primary care. The methodological quality of studies selected for retrieval will be assessed by two independent reviewers before inclusion in the review using the CASP tool. Thematic synthesis will be used to identify key categories and themes from the qualitative data. The Confidence in the Evidence from Reviews of Qualitative research approach will be used to assess how much confidence to place in findings from the qualitative evidence synthesis.

Ethics and dissemination:

This review will use published data. No ethical issues are foreseen. The findings will be disseminated to the medical community via journal publication and conference presentation(s).

Prospero registration number: 91978

Keywords:

Decision-making; multimorbidity; primary care

Strengths and limitations of this study

Strengths:

- Systematic review of physicians' perceptions on forces that play a role on decisions they make with patients with multimorbidity.
- Focus on decision-making processes and dysrationality promoting factors.
- Potential to impact health practice and policy by identifying the main barriers and promoting factors to good decision-making in primary care with multimorbidity patients

Limitations:

- Limited to primary care physicians' experiences in decision-making with multimorbidity patients. Another review with patient perspectives would complement the phenomena and better inform the development of implementation strategies.

Introduction

Rationale

Research reveals that the quality of medical decision-making is highly related to patient safety and reports state that bad clinical decisions lead to considerable morbidity and mortality.(1). Medical decisions are at the core of the clinical encounter and good patient outcomes correlate with a physician's capacity for good clinical judgement.(2).

The paradoxical reality of primary care

In primary care, patients with multiple chronic disease are the rule and not the exception.(3–5) Despite the actual predominance of multiple chronic conditions, medical care remains centred on the diagnosis and treatment of single diseases.(6) Medicine moved into an era of accountability, scrutiny, measurement, pay-for-performance and market based principles.(7) While these developments aimed to increase quality, they reinforced fragmentation and disease centred health care and make the holistic, integrated and person centred decision-making a difficult goal to accomplish.(8)

Patients with multimorbidity have complex needs that challenge evidence based medical decision and not surprisingly generalist specialties are the ones most prone to erroneous medical decision.(9)(10) Firstly, for many years medical research excluded patients with multimorbidity from clinical trials.(11) This undermines and generates uncertainty and doubt in clinical decision with these patients.(12) Secondly, quality is defined by clinical-practice guidelines written by authoritative speciality organizations which aim to improve medical care but tend to focus on a single organ or system and it is not clear how physicians estimate benefits and harms when applying them to patients with multimorbidity.(13) Thirdly, a complex web of positive (e.g. accreditation, pay-for-performance) or negative reinforcement (e.g. administrative sanctions or loss of income) are built around disease-specific quality indicators. Fourthly, productivity is measured by the number of clinical contacts or medical procedures per unit of time thereby decreasing consultation times (14). All these factors create a primary care clinical encounter surrounded by high levels of uncertainty, complexity and a particularly demanding medical decision-making context.(15) Qualitative research confirms that physicians feel less than confident in applying the guidelines and recommendations. They perceive that guidelines ignore contextual variables, seldom consider multimorbidity, socio-personal context and patient preferences, and ultimately are not considered useful because they add to the complexity of real world decision-making.(16,17)

In summary, multimorbidity is ever more common and challenges physicians with increased uncertainty and complexity. Yet, health care systems have evolved towards a fragmented, single-disease care, failing to answer to this epidemiological transition.(18) This is the paradoxical reality of primary care under which health care decisions are made. A reality that needs better tools to help physicians to make optimal decision-making in patients with multimorbidity.

The theoretical framework of medical decision making

Cognitive psychology's most consensual and known model for human decision-making is the *dual process theory*.(19) This model states that decision making is the result of the

integration between two cognitive systems. System 1, or the *intuitive approach,* is experiential and works based on fast and frugal heuristics and pattern recognition that triggers an automated mode of thinking.(20) System 2, or the *analytical approach,* is characterized by being a deliberated, slower and rational thinking process. Under this system people use deductive reasoning to test hypotheses and solve problems. (20,21) This theory has been adapted for clinical decision-making and proposes that clinical reasoning and decision-making are the result of a permanent interaction between the two systems. (22) This will be the theoretical framework of this systematic review.

Croskerry defined optimal medical decision-making as the one that is *logical, evidence based, follows the laws of science and probability and leads to decisions that are consistent with rational choice theory*.(22) But this outcome is not possible in most situations mainly due to *dysrationality* in decision-making which means that different types of cognitive bias compromise rationality when making decisions.(22,23) Cognitive psychology research has shown that people tend to use simple strategies and seek adequate solutions that make sense in their environment in what Gigerenzer called *ecological rationality*.(24,25) While this heuristic or *intuitive approach* can be highly economical and effective, it may not be appropriate when physicians are confronted with complexity and uncertainty.(26) Multimorbidity is an interesting condition to explore how physicians use system 1 and system 2 in their decisions.

The need for real world research

Research in clinical reasoning and medical decision in a real world context is needed, particularly with experienced physicians and how to embrace uncertainty in primary care.(11,15,21,22,27–30) This research is particularly demanding in a chronic diseases context. Outcomes are not immediate and, in many circumstances, have to be defined case to case as in the complex or frail patient, making decision awareness and self-evaluation difficult tasks for the clinician.

In primary care, qualitative research on decision-making with multimorbidity patients has explored physicians' perspectives on patient management (31), organizational issues (32) and prescribing decisions (9). To our knowledge, no review has compiled information regarding the way clinicians think and decision-making *dysrationality* promoting factors. To improve good clinical judgement by ensuring it is more rational, but at the same time tailored to each patient's unique characteristics, we need to better understand the way we think and which forces play a role and affect each of our medical decisions.

Objectives

The aim of the present review is to identify and synthesize available qualitative evidence about primary care physician decision-making processes when attending patients with multimorbidity.

The main research question under study is the following:
According to available qualitative research, which facilitators and barriers are perceived by primary care physicians on decision-making with patients with multimorbidity?

Methods

Preferred reporting items for systematic review and meta-analysis protocol (PRISMA P) guidelines were followed to elaborate this protocol.(33) See Additional file 1 for PRISMA-P checklist application on this protocol.
A thematic synthesis approach will be used to allow identification of key categories and themes from the qualitative data. This method aims to generate descriptive themes from line-by-line coding and the translation of concepts from one study to another, as well as analytical themes, allowing new insights and interpretations beyond the content of the original studies.(34)(35)

Eligibility criteria

Types of studies

The current review will consider qualitative research studies. This includes any study that uses qualitative methods for data collection such as interviews (individual and focus group), observation as well as qualitative methods for data analysis such as thematic analysis. Mixed-methods studies will be considered if the applied qualitative methodology was as previously described.

Types of participants

The review will consider qualitative studies enrolling GP/primary care physicians/ family physicians.

Context and phenomena of interest

The context of the studies is primary care and the review will include studies that evaluate family physicians' perspectives/ opinions/ perceptions on decision-making concerning the management of multimorbidity patients. For this purpose, "decision" will be considered a situation where a course of action or recommendation was followed among one or several possible alternatives.

Information sources

The databases to be searched include PubMed, CINAHL, PsycINFO, Embase and Web of Science. The search for unpublished studies will include ProQuest Dissertations and Theses. We aim to find both published and unpublished studies.
We will also search other resources such as the reference list of included studies, grey literature including government or non-governmental organisation reports. The original study authors will be contacted for clarification if needed.

Search Strategy

We will include studies published in Portuguese, Spanish and English language (due to limited funding for translators) and there will be no date limit. Since decision making has

been studied for decades, this broad timeframe will ensure that all relevant studies on this topic are included in the systematic review.
The search strategy is presented in Additional file 2.

Patients and Public

Patients and the public were not involved in this study.

Study Records

Data management

Study screening and selection will be conducted using Mendeley Ltd. software and Google Spreadsheets.

Selection process

Two authors (DSR and PS) will independently screen titles and read the abstracts for papers with relevant titles. Full papers will be retrieved for papers with relevant abstracts and reviewed by the two researchers. The full text of potentially eligible articles will be screened for inclusion in the review by DSR and NB. Disagreements will be resolved by discussion and consensus or with a third author (BH). The reasons for exclusion of studies in this last screening stage will be recorded, tabulated and published with the final paper. If the included studies are fifty or more, a purposeful sampling method will be used to select the ones from which data will be extracted.

Data collection process

DSR and NB will consider and collect all of the text labelled as findings/results and discussion/conclusions/interpretations in the original study reports selected for inclusion in the review.(34) Data will be extracted verbatim from study papers directly into NVivo-11 software (QSR International).

Data items

For each of the included study the following additional information will be collected by DSR: authors; title; year(s) of data collection; year of publication; study population; phenomena of interest; study setting; study country; theoretical framework; data collection method used (eg. interviews, focus groups, document analysis, etc.). NB will assess original studies for confirmation. Disagreements will be resolved by discussion and consensus or with a third author (BH). The researchers will look for family physicians' views/perspectives on situations where a course of action or recommendation was followed among one or several possible alternatives. These data will be recorded, tabulated and published with the final paper.

Outcomes and Synthesis strategy

The data will be analysed according to established guidelines on thematic synthesis.(34) This method consists of a three step approach to the synthesis of qualitative data. Firstly, the results from qualitative studies will be coded line-by-line according to content and meaning. This process will require re-reading and recoding, as well as discussion between the research team to determine the need for new codes or the re-evaluation of existing ones.

The analysis will be theoretically driven by the literature on cognitive reasoning models such as the dual process theory(22) through a deductive approach. Moreover, the researchers will remain aware of new concepts that may emerge from the data itself. Accordingly, the construction of descriptive themes will be based on the translation of concepts from one study to another, which means recognizing the same concepts across studies, and in the development of a hierarchical coding structure based on the similarities and differences between the codes.
The third stage of thematic synthesis, as described by Thomas et al.(34), implies an iterative analysis of the results of stage 1 and 2 generating new themes that emerge transversally to all review studies. This last step of thematic synthesis goes beyond the content of the original studies, with new concepts and understandings emerging from the descriptive themes being organized into analytical themes.

This process will be carried by DSR and NB consulting with the research team. At this point, interpretations of information and barrier themes that primary care physicians value when making decisions with multimorbidity patients will emerge. All these stages of data synthesis will be recorded in NVivo-11 to allow for an auditable track. The findings of the synthesis process will be presented by grouping textual excerpts from included studies that represent similar meanings or themes. Whenever that grouping is not possible a narrative form will be used.

Risk of bias in individual studies

The methodological quality of the studies selected for retrieval will be assessed by two independent reviewers (DSR and NB) before inclusion in the review using the CASP tool.(36) Any disagreements that arise between the reviewers will be resolved through discussion, or with a third reviewer (AA). Quality assessment will not be used to exclude studies.

Confidence in cumulative evidence

The Confidence in the Evidence from Reviews of Qualitative research (CERQual) approach will be used to assess how much confidence to place in findings from the qualitative evidence synthesis.(37) This assessment of *confidence* in the review findings is based on four components: the *methodological limitations* of the qualitative studies contributing to a review finding; the *relevance* to the review question of the studies contributing to a review finding; the *coherence* of the review finding, and the *adequacy* of data supporting a review finding.(37) Findings will be classified as having *high, moderate, low* or *very low* confidence. DSR and NB will independently apply the CERQual tool to the review findings. Disagreements will be resolved by discussion and consensus. If disagreements persist, a third author (BH) will consulted. CERQual Qualitative Evidence Profiles and Summary of Qualitative Findings table will be recorded and published with the final paper.

Reporting

This protocol was created using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA)-P Statement for reporting systematic review protocols.(33)

The qualitative systematic review study report will follow the Enhancing Transparency in Reporting the synthesis of Qualitative research (ENTREQ) statement for reporting syntheses of qualitative studies.(38)

Discussion

Research in clinical reasoning and medical decision in a real world context is needed, particularly with experienced physicians (10,21,27–30) This review will increase knowledge and awareness by more accurately identifying physicians' perceptions about the factors that play a role in their decision-making. It will focus on decision-making processes and dysrationality promoting factors. This different "lens" will allow us to enhance existing systematic reviews of qualitative research about multimorbidity which so far have mostly focused on organizational issues.

We have reasons to believe that the main flaws in decision-making are probably inherent in the way physicians think, rather than in clinical knowledge deficits. For example, it could be predicted that, among other *dysrationality* promoters, the tendency to avoid the complexity of multimorbidity may play a significant role. This systematic review will provide evidence that will support or contradict that idea.

Results from this systematic review will have the potential to impact health practice and policy by identifying the main promoters and barriers of decision-making in primary care with multimorbidity patients. The results may allow the improvement of knowledge transference strategies or the creation of new ones. Ultimately, they will be useful for informing practice physicians, in creating tools that can help decision-making, in improving medical education, in further academic research and for private industry or public health policy decision-makers.

Additional Files

Additional file 1 – PRISMA-P checklist
Additional file 2 – Search Strategy

Abbreviations

Author's contributions

DSR is the guarantor. DSR conceived the review and drafted the protocol. BH and IS assisted with framing the research question and objectives and contributed to the drafting and revision of the protocol. PS and NB contributed to the drafting and revision of the protocol. AA assisted with planning the methodological approach and contributed to the drafting and revision of the protocol. MAA assisted with the search strategy and contributed to the drafting and revision of the protocol. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

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Additional file 2 - PRISMA-P 2015 Checklist

This checklist has been adapted for use with protocol submissions to *Systematic Reviews* from Table 3 in Moher D et al: Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic Reviews* 2015 **4**:1

Section/topic	#	Checklist item	Information reported		Line number(s)
			Yes	No	
ADMINISTRATIVE INFORMATION					
Title					
Identification	1a	Identify the report as a protocol of a systematic review	☒	☐	3
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	☐	☒	
Registration	2	If registered, provide the name of the registry (e.g., PROSPERO) and registration number in the Abstract	☒	☐	6
Authors					
Contact	3a	Provide name, institutional affiliation, and e-mail address of all protocol authors; provide physical mailing address of corresponding author	☒	☐	11
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	☒	☐	21
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	☐	☒	
Support					
Sources	5a	Indicate sources of financial or other support for the review	☒	☐	30
Sponsor	5b	Provide name for the review funder and/or sponsor	☒	☐	344
Role of sponsor/funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	☐	☒	NA
INTRODUCTION					
Rationale	6	Describe the rationale for the review in the context of what is already known	☒	☐	78
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	☒	☐	168

Section/topic	#	Checklist item	Information reported		Line number(s)
			Yes	No	
METHODS					
Eligibility criteria	8	Specify the study characteristics (e.g., PICO, study design, setting, time frame) and report characteristics (e.g., years considered, language, publication status) to be used as criteria for eligibility for the review	☒	☐	184
Information sources	9	Describe all intended information sources (e.g., electronic databases, contact with study authors, trial registers, or other grey literature sources) with planned dates of coverage	☒	☐	199
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	☒	☐	207
STUDY RECORDS					
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	☒	☐	215
Selection process	11b	State the process that will be used for selecting studies (e.g., two independent reviewers) through each phase of the review (i.e., screening, eligibility, and inclusion in meta-analysis)	☒	☐	218
Data collection process	11c	Describe planned method of extracting data from reports (e.g., piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	☒	☐	226
Data items	12	List and define all variables for which data will be sought (e.g., PICO items, funding sources), any pre-planned data assumptions and simplifications	☒	☐	232
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	☐	☐	240
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	☐	☐	262
DATA					
Synthesis	15a	Describe criteria under which study data will be quantitatively synthesized	☐	☒	NA
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data, and methods of combining data from studies, including any planned exploration of consistency (e.g., I^2, Kendall's tau)	☐	☒	NA
	15c	Describe any proposed additional analyses (e.g., sensitivity or subgroup analyses, meta-regression)	☐	☒	NA
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	☒	☐	241

Section/topic	#	Checklist item	Information reported		Line number(s)
			Yes	No	
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (e.g., publication bias across studies, selective reporting within studies)	☐	☒	NA
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (e.g., GRADE)	☒	☐	269

Appendices

Appendix 2 – Search strings

Electronic bibliographic databases and platforms

1.1. Search strategy for MEDLINE (via PubMED interface)

#1 ("Decision Making" [MeSH Terms, exp all trees]) OR ("Medical Records" [MeSH Terms, exp all trees]) OR ("Information Seeking Behavior" [MeSH Terms, exp all trees])

#2 ("Primary Health Care" [MeSH Terms, exp all trees]) OR ("General Practitioners" [MeSH Terms, exp all trees]) OR (Physicians [MeSH Terms, exp all trees]) OR ("Physicians, Family" [MeSH Terms, exp all trees])

#3 interview [ti,ab] OR "focus group" [ti,ab]

#4 (Comorbidity [MeSH Terms, exp all trees]) OR ("Multiple Chronic Conditions" [MeSH Terms, exp all trees]) OR (Multimorbidity [MeSH Terms, exp all trees]) OR multimorbidit* [mp] OR "multi morbidit*" [mp] OR multi-morbidit* [mp]

#5 #1 AND #2 AND #3 AND #4

1.2. Search strategy for Web of Science (via B-ON interface)

#1 ("decision making").kw OR ("medical records").kw OR ("information seeking behaviour").kw

#2 ("primary health care").kw OR ("general practitioners").kw OR (physicians).kw OR ("family physicians").kw OR ("family doctor").kw

#3 (interview).ti OR ("focus group").ti

#4 (comorbidity).kw OR ("multiple chronic conditions").kw OR (multimorbidity).kw OR ("multi morbidit*").ti OR ("multi-morbidit*").ti

#5 #1 AND #2 AND #3 AND #4

1.3. Search strategy for SCOPUS

URL: http://www.scopus.com, using all types of documents and published until present.

#1 ("decision making").ti,abs,key OR ("medical records").ti,abs,key OR ("information seeking behaviour").ti,abs,key

#2 ("primary health care").ti,abs,key OR ("general practitioners").ti,abs,key OR (physicians).ti,abs,key OR ("family physician").ti,abs,key OR ("family doctor").ti,abs,key

#3 (interview).ti,abs,key OR (focus group).ti,abs,key

#4 (comorbidity).ti,abs,key OR (multiple chronic conditions).ti,abs,key OR (multimorbidity).ti,abs,key OR (multi morbidit*).ti,abs,key OR (multi-morbidit*).ti,abs,key

#5 #1 AND #2 AND #3 AND #4

1.4. Search strategy for EMBASE (via OVID interface)

#1 exp decision making/

#2 exp medical records/

#3 1 or 2

#4 exp primary health care/

#5 exp general practitioner/

#6 exp physician/

#7 4 or 5 or 6

#8 exp interview/

#9 exp multiple chronic conditions/

#10 exp comorbidity/

#11 9 or 10

#12 3 and 7 and 8 and 11

1.5. Search strategy for PsychINFO (via OVID interface)

#1 exp decision making/

#2 exp medical records/

#3 1 or 2

#4 exp primary health care/

#5 exp general practitioners/

#6 exp physicians/

#7 exp family physicians/

#8 4 or 5 or 6 or 7

#9 exp interviews/

#10 exp comorbidity/

#11 multi morbidity.m_titl.

#12 multi-morbidity.m_titl.

#13 multimorbidity.m_titl.

#14 10 or 11 or 12 or 13

#15 3 and 8 and 9 and 14

1.6. Search strategy for CINAHL (via EBSCO interface)

#1 (decision making).su OR (medical records).su OR (information seeking behavior).su

#2 (primary health care).su OR (general practitioner).su OR (physician).su OR (family physician).su OR (family doctor).su

#3 (interview).tx OR (focus group).tx

#4 (comorbidity).su OR (multiple chronic conditions).su OR (multimorbidity).su OR (multi morbidity).tx

#5 #1 AND #2 AND #3 AND #4

1.7. Search strategy for ProQuest Dissertations & Theses Global (via ProQuest interface)

#1 su(decision making)

#2 su(medical records)

#3 su(information seeking behaviour)

#4 #1 OR #2 OR #3

#5 su(primary health care)

#6 su(general practitioner)

#7 su(physicians)

#8 su(family physician)

#9 su(family doctor)

#10 #5 OR #6 OR #7 OR #8 OR #9

#11 ft(interview)

#12 ft(focus group)

#13 #11 OR #12

#14 su(comorbidity)

#15 su(multimorbidity)

#16 ft(multi morbidity)

#17 ft(multi-morbidity)

#18 #14 OR #15 OR #16 OR #17

#19 #4 AND #10 AND #13 AND #18

BMJ Open

Primary care physicians' decision-making processes in the context of multimorbidity: protocol of a systematic review and thematic synthesis of qualitative research.

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2018-023832.R2
Article Type:	Protocol
Date Submitted by the Author:	16-Oct-2018
Complete List of Authors:	Rodrigues, David; Nova Medical School, Nova University of Lisbon, Family Medicine Unit Sousa, Paulo; Nova Medical School, Nova University of Lisbon, Family Medicine Unit Basílio, Nuno; Nova Medical School, Nova University of Lisbon, Family Medicine Unit Antunes, Ana; Nova Medical School, Nova University of Lisbon, Chronic Diseases Research Center (CEDOC) Antunes, Maria da Luz; Instituto Politecnico de Lisboa Escola Superior de Tecnologia da Saude de Lisboa Santos, Maria Isabel; Nova Medical School, Nova University of Lisbon, Family Medicine Unit Heleno, B; Nova Medical School, Nova University of Lisbon, Family Medicine Unit
Primary Subject Heading:	Qualitative research
Secondary Subject Heading:	General practice / Family practice, Medical education and training, Evidence based practice
Keywords:	decision making, multimorbidity, QUALITATIVE RESEARCH, PRIMARY CARE

Primary care physicians' decision-making processes in the context of multimorbidity: protocol of a systematic review and thematic synthesis of qualitative research.

This systematic review protocol was registered with the International Prospective Register of Systematic Reviews (PROSPERO) with ID 91978.

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4 - APPsyCI – Applied Psychology Research Center Capabilities & Inclusion, ISPA – University Institute, Portugal.

Contributions: DSR is the guarantor. DSR conceived the review and led the drafting of the protocol. BH and IS assisted with framing the research question and objectives and contributed to the drafting and revision of the protocol. PS and NB contributed to the drafting and revision of the protocol. AA assisted with planning the methodological approach and contributed to the drafting and revision of the protocol. MAA assisted with the search strategy and contributed to the drafting and revision of the protocol. All authors read and approved the final manuscript.

Amendments

In the event of protocol amendments, the date of each amendment will be accompanied by a description of the change and the rationale.

Support

This systematic review is supported by the authors and no funding was attributed. This work is part of DSR's PhD program.

Abstract

Introduction:

Good patient outcomes correlate with the physicians' capacity for good clinical judgement. Multimorbidity is common and it increases uncertainty and complexity in the clinical encounter. However, health-care systems and medical education are centred on individual diseases. In consequence, recognition of the patient as the centre of the decision-making process becomes even more difficult. Research in clinical reasoning and medical decision in a real world context is needed. The aim of the present review is to identify and synthesize available qualitative evidence on primary care physicians' perspectives, views or experiences on decision-making with multimorbidity patients.

Methods and analysis:

This will be a systematic review of qualitative research where PubMed, CINAHL, PsycINFO, Embase and Web of Science will be searched, supplemented with manual searches of reference lists of included studies. Qualitative studies published in Portuguese, Spanish and English language will be included, with no date limit. Studies will be eligible when they evaluate family physicians' perspectives, opinions or perceptions on decision making for patients with multimorbidity in primary care. The methodological quality of studies selected for retrieval will be assessed by two independent reviewers before inclusion in the review using the CASP tool. Thematic synthesis will be used to identify key categories and themes from the qualitative data. The Confidence in the Evidence from Reviews of Qualitative research approach will be used to assess how much confidence to place in findings from the qualitative evidence synthesis.

Ethics and dissemination:

This review will use published data. No ethical issues are foreseen. The findings will be disseminated to the medical community via journal publication and conference presentation(s).

Prospero registration number: 91978

Keywords:

Decision-making; multimorbidity; primary care

Strengths and limitations of this study

Strengths:

- Systematic review of physicians' perceptions on forces that play a role on decisions they make with patients with multimorbidity.
- Focus on decision-making processes and dysrationality promoting factors.
- Potential to impact health practice and policy by identifying the main barriers and promoting factors to good decision-making in primary care with multimorbidity patients

Limitations:

- Limited to primary care physicians' experiences in decision-making with multimorbidity patients. Another review with patient perspectives would complement the phenomena and better inform the development of implementation strategies.

Introduction

Rationale

Research reveals that the quality of medical decision-making is highly related to patient safety and reports state that bad clinical decisions lead to considerable morbidity and mortality.(1). Medical decisions are at the core of the clinical encounter and good patient outcomes correlate with a physician's capacity for good clinical judgement.(2).

The paradoxical reality of primary care

In primary care, patients with multiple chronic disease are the rule and not the exception.(3–5) Despite the actual predominance of multiple chronic conditions, medical care remains centred on the diagnosis and treatment of single diseases.(6) Medicine moved into an era of accountability, scrutiny, measurement, pay-for-performance and market based principles.(7) While these developments aimed to increase quality, they reinforced fragmentation and disease centred health care and make the holistic, integrated and person centred decision-making a difficult goal to accomplish.(8)

Patients with multimorbidity have complex needs that challenge evidence based medical decision and not surprisingly generalist specialties are the ones most prone to erroneous medical decision.(9)(10) Firstly, for many years medical research excluded patients with multimorbidity from clinical trials.(11) This undermines and generates uncertainty and doubt in clinical decision with these patients.(12) Secondly, quality is defined by clinical-practice guidelines written by authoritative speciality organizations which aim to improve medical care but tend to focus on a single organ or system and it is not clear how physicians estimate benefits and harms when applying them to patients with multimorbidity.(13) Thirdly, a complex web of positive (e.g. accreditation, pay-for-performance) or negative reinforcement (e.g. administrative sanctions or loss of income) are built around disease-specific quality indicators. Fourthly, productivity is measured by the number of clinical contacts or medical procedures per unit of time thereby decreasing consultation times (14). All these factors create a primary care clinical encounter surrounded by high levels of uncertainty, complexity and a particularly demanding medical decision-making context.(15) Qualitative research confirms that physicians feel less than confident in applying the guidelines and recommendations. They perceive that guidelines ignore contextual variables, seldom consider multimorbidity, socio-personal context and patient preferences, and ultimately are not considered useful because they add to the complexity of real world decision-making.(16,17)

In summary, multimorbidity is ever more common and challenges physicians with increased uncertainty and complexity. Yet, health care systems have evolved towards a fragmented, single-disease care, failing to answer to this epidemiological transition.(18) This is the paradoxical reality of primary care under which health care decisions are made.

The theoretical framework of medical decision making

Cognitive psychology's most consensual and known model for human decision-making is the *dual process theory*.(19) This model states that decision making is the result of the integration

between two cognitive systems. System 1, or the *intuitive approach,* is experiential and works based on fast and frugal heuristics and pattern recognition that triggers an automated mode of thinking.(20) System 2, or the *analytical approach,* is characterized by being a deliberated, slower and rational thinking process. Under this system people use deductive reasoning to test hypotheses and solve problems. (20,21) This theory has been adapted for clinical decision-making and proposes that clinical reasoning and decision-making are the result of a permanent interaction between the two systems. (22)

Croskerry defined optimal medical decision-making as the one that is logical, evidence based, follows the laws of science and probability and leads to decisions that are consistent with rational choice theory.(22) Under this definition, rationality is an essential characteristic of good decision-making. Resulting from the analysis of different theories and models, a core set of five principles of *rational decision* has been proposed.(23) These principles determine rational decision as the one that weights benefits and harms in order to achieve a goal; it is usually surrounded by uncertainty; it is informed by human cognitive architecture (dual processing system); it depends on the context and epistemological, environmental, and computational constraints of human brains and finally the decision is closely linked to ethics and moral values.(23) Substantial gaps still limit our understanding of how these principles interact with cognitive bias leading to dysrationality in our decisions.(22,24) Multimorbidity (with its implicit uncertainty and complexity) is an interesting condition to explore these gaps.(25)

The need for real world research

Research in clinical reasoning and medical decision in a real world context is needed, particularly with experienced physicians and how to embrace uncertainty in primary care.(11,15,21,22,26–28) This research is particularly demanding in a chronic diseases context. Outcomes are not immediate and, in many circumstances, have to be defined case to case as in the complex or frail patient, making decision awareness and self-evaluation difficult tasks for the clinician.

In primary care, qualitative research on decision-making with multimorbidity patients has explored physicians' perspectives on patient management (29), organizational issues (30) and prescribing decisions.(9) To our knowledge, no review has compiled information regarding the way clinicians think and *rational decision-making* promoting factors. To improve good clinical judgement by ensuring it is more rational, but at the same time tailored to each patient's unique characteristics, we need to better understand the way primary care physicians think, and which forces play a role and affect each of their medical decisions.

Objectives

The aim of the present review is to identify and synthesize available qualitative evidence about primary care physician decision-making when attending patients with multimorbidity.

The main research question under study is the following:

According to available qualitative research, which facilitators and barriers are perceived by primary care physicians on decision-making with patients with multimorbidity?

Methods

Preferred reporting items for systematic review and meta-analysis protocol (PRISMA P) guidelines were followed to elaborate this protocol.(31) See Additional file 1 for PRISMA-P checklist application on this protocol.
A thematic synthesis approach will be used to allow identification of key categories and themes from the qualitative data. This method aims to generate descriptive themes from line-by-line coding and the translation of concepts from one study to another, as well as analytical themes, allowing new insights and interpretations beyond the content of the original studies.(32)(33)

Eligibility criteria

Types of studies

The current review will consider qualitative research studies. This includes any study that uses qualitative methods for data collection such as interviews (individual and focus group), observation as well as qualitative methods for data analysis such as thematic analysis. Mixed-methods studies will be considered if the applied qualitative methodology was as previously described.

Types of participants

The review will consider qualitative studies enrolling GP/primary care physicians/ family physicians.

Context and phenomena of interest

The context of the studies is primary care and the review will include studies that evaluate family physicians' perspectives/ opinions/ perceptions on decision-making concerning the management of multimorbidity patients. For this purpose, "multimorbidity" will be considered as the co-occurrence of more than one chronic condition in an individual. We recognized that many studies until now did not made a clear distinction between multimorbidity and comorbidity and for that reason studies considering comorbidity may be included.(34) Also, "decision" will be considered a situation where a course of action or recommendation was followed among one or several possible alternatives.

Information sources

The databases to be searched include PubMed, CINAHL, PsycINFO, Embase and Web of Science. The search for unpublished studies will include ProQuest Dissertations and Theses. We aim to find both published and unpublished studies.

We will also search other resources such as the reference list of included studies, grey literature including government or non-governmental organisation reports. The original study authors will be contacted for clarification if needed.

Search Strategy

We will include studies published in Portuguese, Spanish and English language (due to limited funding for translators) and there will be no date limit. Since decision making has been studied for decades, this broad timeframe will ensure that all relevant studies on this topic are included in the systematic review.
The search strategy is presented in Additional file 2.

Patients and Public

Patients and the public were not involved in this study.

Study Records

Data management

Study screening and selection will be conducted using Mendeley Ltd. software and Google Spreadsheets.

Selection process

Two authors (DSR and PS) will independently screen titles and read the abstracts for papers with relevant titles. Full papers will be retrieved for papers with relevant abstracts and reviewed by the two researchers. The full text of potentially eligible articles will be screened for inclusion in the review by DSR and NB. Disagreements will be resolved by discussion and consensus or with a third author (BH). The reasons for exclusion of studies in this last screening stage will be recorded, tabulated and published with the final paper. If the included studies are fifty or more, a purposeful sampling method will be used to select the ones from which data will be extracted.(35)

Data collection process

DSR and NB will consider and collect all of the text labelled as findings/results and discussion/conclusions/interpretations in the original study reports selected for inclusion in the review.(32) Data will be extracted verbatim from study papers directly into NVivo-11 software (QSR International).

Data items

For each of the included study the following additional information will be collected by DSR: authors; title; year(s) of data collection; year of publication; study population; phenomena of interest; study setting; study country; theoretical framework; data collection method used (eg. interviews, focus groups, document analysis, etc.). NB will assess original studies for confirmation. Disagreements will be resolved by discussion and consensus or with a third author

(BH). The researchers will look for family physicians' views/perspectives on situations where a course of action or recommendation was followed among one or several possible alternatives. These data will be recorded, tabulated and published with the final paper.

Outcomes and Synthesis strategy

The data will be analysed according to established guidelines on thematic synthesis.(32) This method consists of a three step approach to the synthesis of qualitative data. Firstly, the results from qualitative studies will be coded line-by-line according to content and meaning.
This process will require re-reading and recoding, as well as discussion between the research team to determine the need for new codes or the re-evaluation of existing ones. The analysis will be theoretically driven by the literature on cognitive reasoning models such as the dual process theory(22) through a deductive approach. Moreover, the researchers will remain aware of new concepts that may emerge from the data itself. Accordingly, the construction of descriptive themes will be based on the translation of concepts from one study to another, which means recognizing the same concepts across studies, and in the development of a hierarchical coding structure based on the similarities and differences between the codes.
The third stage of thematic synthesis, as described by Thomas et al.(32), implies an iterative analysis of the results of stage 1 and 2 generating new themes that emerge transversally to all review studies. This last step of thematic synthesis goes beyond the content of the original studies, with new concepts and understandings emerging from the descriptive themes being organized into analytical themes.

This process will be carried by DSR and NB consulting with the research team. At this point, interpretations of information and barrier themes that primary care physicians value when making decisions with multimorbidity patients will emerge. All these stages of data synthesis will be recorded in NVivo-11 to allow for an auditable track. The findings of the synthesis process will be presented by grouping textual excerpts from included studies that represent similar meanings or themes. Whenever that grouping is not possible a narrative form will be used.

Risk of bias in individual studies

The methodological quality of the studies selected for retrieval will be assessed by two independent reviewers (DSR and NB) before inclusion in the review using the CASP tool.(36) Any disagreements that arise between the reviewers will be resolved through discussion, or with a third reviewer (AA). Quality assessment will not be used to exclude studies.

Confidence in cumulative evidence

The Confidence in the Evidence from Reviews of Qualitative research (CERQual) approach will be used to assess how much confidence to place in findings from the qualitative evidence synthesis.(37) This assessment of *confidence* in the review findings is based on four components: the *methodological limitations* of the qualitative studies contributing to a review finding; the *relevance* to the review question of the studies contributing to a review finding; the *coherence* of the review finding, and the *adequacy* of data supporting a review finding.(37)

Findings will be classified as having *high, moderate, low* or *very low* confidence. DSR and NB will independently apply the CERQual tool to the review findings. Disagreements will be resolved by discussion and consensus. If disagreements persist, a third author (BH) will consulted. CERQual Qualitative Evidence Profiles and Summary of Qualitative Findings table will be recorded and published with the final paper.

Reporting

This protocol was created using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA)-P Statement for reporting systematic review protocols.(31)
The qualitative systematic review study report will follow the Enhancing Transparency in Reporting the synthesis of Qualitative research (ENTREQ) statement for reporting syntheses of qualitative studies.(38)

Discussion

Research in clinical reasoning and medical decision in a real world context is needed, particularly with experienced physicians (10,21,26–28) This review will increase knowledge and awareness by more accurately identifying physicians' perceptions about the factors that play a role in their decision-making. It will focus on decision-making processes and rationality promoting factors. This different "lens" will allow us to enhance existing systematic reviews of qualitative research about multimorbidity which so far have mostly focused on organizational issues.

We have reasons to believe that the main flaws in decision-making are probably inherent in the way physicians think, rather than in clinical knowledge deficits. For example, it could be predicted that, among other *dysrationality* promoters, the tendency to avoid the complexity of multimorbidity may play a significant role. This systematic review will provide evidence that will support or contradict that idea.

Results from this systematic review will have the potential to impact health practice and policy by identifying the main promoters and barriers of decision-making in primary care with multimorbidity patients. The results may allow the improvement of knowledge transference strategies or the creation of new ones. Ultimately, they will be useful for informing practice physicians, in creating tools that can help decision-making, in improving medical education, in further academic research and for private industry or public health policy decision-makers.

Additional Files

Additional file 1 – PRISMA-P checklist
Additional file 2 – Search Strategy

Abbreviations

Author's contributions

DSR is the guarantor. DSR conceived the review and drafted the protocol. BH and IS assisted with framing the research question and objectives and contributed to the drafting and revision of the protocol. PS and NB contributed to the drafting and revision of the protocol. AA assisted with planning the methodological approach and contributed to the drafting and revision of the protocol. MAA assisted with the search strategy and contributed to the drafting and revision of the protocol. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

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Additional file 1 - PRISMA-P 2015 Checklist

This checklist has been adapted for use with protocol submissions to *Systematic Reviews* from Table 3 in Moher D et al: Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic Reviews* 2015 4:1

Section/topic	#	Checklist item	Information reported		Line number(s)
			Yes	No	
ADMINISTRATIVE INFORMATION					
Title					
Identification	1a	Identify the report as a protocol of a systematic review	☒	☐	3
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	☐	☒	
Registration	2	If registered, provide the name of the registry (e.g., PROSPERO) and registration number in the Abstract	☒	☐	6
Authors					
Contact	3a	Provide name, institutional affiliation, and e-mail address of all protocol authors; provide physical mailing address of corresponding author	☒	☐	11
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	☒	☐	21
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	☐	☒	
Support					
Sources	5a	Indicate sources of financial or other support for the review	☒	☐	30
Sponsor	5b	Provide name for the review funder and/or sponsor	☒	☐	344
Role of sponsor/funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	☐	☒	NA
INTRODUCTION					
Rationale	6	Describe the rationale for the review in the context of what is already known	☒	☐	78
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	☒	☐	168

METHODS					
		Specify the study characteristics (e.g., PICO, study design, setting, time frame) and report			184
Eligibility criteria	8	characteristics (e.g., years considered, language, publication status) to be used as criteria for eligibility for the review			
Information sources	9	Describe all intended information sources (e.g., electronic databases, contact with study authors, registers, or other grey literature sources) with planned dates of coverage	☒	☐	199 trial
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	☒	☐	207
STUDY RECORDS			☒	☐	
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review			215
			☒	☐	
Selection process	11b	State the process that will be used for selecting studies (e.g., two independent reviewers) through each phase of the review (i.e., screening, eligibility, and inclusion in meta-analysis)	☒	☐	218
Data collection process	11c	Describe planned method of extracting data from reports (e.g., piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	☒	☐	226
Data items	12	List and define all variables for which data will be sought (e.g., PICO items, funding sources), any pre-planned data assumptions and simplifications	☒	☐	232
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	☐	☐	240
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	☐	☐	262
DATA			☐	☒	
Synthesis	15a	Describe criteria under which study data will be quantitatively synthesized	☐	☒	NA
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data, and methods of combining data from studies, including any planned exploration of consistency (e.g., I^2, Kendall's tau)	☐	☒	NA
			☒	☐	

	15c	Describe any proposed additional analyses (e.g., sensitivity or subgroup analyses, meta-regression)	NA
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	241

Section/topic	#	Checklist item	Information reported		Line number(s)
			Yes	No	
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (e.g., publication bias across studies, selective reporting within studies)	☐	☒	NA
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (e.g., GRADE)	☒	☐	269

Additional file 2 – Search strings

Electronic bibliographic databases and platforms

1.1. Search strategy for MEDLINE (via PubMED interface)

#1 ("Decision Making" [MeSH Terms, exp all trees]) OR ("Medical Records" [MeSH Terms, exp all trees]) OR ("Information Seeking Behavior" [MeSH Terms, exp all trees])

#2 ("Primary Health Care" [MeSH Terms, exp all trees]) OR ("General Practitioners" [MeSH Terms, exp all trees]) OR (Physicians [MeSH Terms, exp all trees]) OR ("Physicians, Family" [MeSH Terms, exp all trees])

#3 interview [ti,ab] OR "focus group" [ti,ab]

#4 (Comorbidity [MeSH Terms, exp all trees]) OR ("Multiple Chronic Conditions" [MeSH Terms, exp all trees]) OR (Multimorbidity [MeSH Terms, exp all trees]) OR multimorbidit* [mp] OR "multi morbidit*" [mp] OR multi-morbidit* [mp]

#5 #1 AND #2 AND #3 AND #4

1.2. Search strategy for Web of Science (via B-ON interface)

#1 ("decision making").kw OR ("medical records").kw OR ("information seeking behaviour").kw

#2 ("primary health care").kw OR ("general practitioners").kw OR (physicians).kw OR ("family physicians").kw OR ("family doctor").kw

#3 (interview).ti OR ("focus group").ti

#4 (comorbidity).kw OR ("multiple chronic conditions").kw OR (multimorbidity).kw OR ("multi morbidit*").ti OR ("multi-morbidit*").ti

#5 #1 AND #2 AND #3 AND #4

1.3. Search strategy for SCOPUS

URL: http://www.scopus.com, using all types of documents and published until present.

#1 ("decision making").ti,abs,key OR ("medical records").ti,abs,key OR ("information seeking behaviour").ti,abs,key

#2 ("primary health care").ti,abs,key OR ("general practitioners").ti,abs,key OR (physicians).ti,abs,key OR ("family physician").ti,abs,key OR ("family doctor").ti,abs,key

#3 (interview).ti,abs,key OR (focus group).ti,abs,key

#4 (comorbidity).ti,abs,key OR (multiple chronic conditions).ti,abs,key OR (multimorbidity).ti,abs,key OR (multi morbidit*).ti,abs,key OR (multimorbidit*).ti,abs,key

#5 #1 AND #2 AND #3 AND #4

1.4. Search strategy for EMBASE (via OVID interface)

#1 exp decision making/

#2 exp medical records/

#3 1 or 2

#4 exp primary health care/

#5 exp general practitioner/

#6 exp physician/

#7 4 or 5 or 6

#8 exp interview/

#9 exp multiple chronic conditions/

#10 exp comorbidity/

#11 9 or 10

#12 3 and 7 and 8 and 11

1.5. Search strategy for PsychINFO (via OVID interface)

#1 exp decision making/

#2 exp medical records/

#3 1 or 2

#4 exp primary health care/

#5 exp general practitioners/

#6 exp physicians/

#7 exp family physicians/

#8 4 or 5 or 6 or 7

#9 exp interviews/

#10 exp comorbidity/

#11 multi morbidity.m_titl.

#12 multi-morbidity.m_titl.

#13 multimorbidity.m_titl.

#14 10 or 11 or 12 or 13

#15 3 and 8 and 9 and 14

1.6. Search strategy for CINAHL (via EBSCO interface)

#1	(decision making).su OR (medical records).su OR (information seeking behavior).su
#2	(primary health care).su OR (general practitioner).su OR (physician).su OR (family physician).su OR (family doctor).su
#3	(interview).tx OR (focus group).tx
#4	(comorbidity).su OR (multiple chronic conditions).su OR (multimorbidity).su OR (multi morbidity).tx
#5	#1 AND #2 AND #3 AND #4

1.7. Search strategy for ProQuest Dissertations & Theses Global (via ProQuest interface)

#1	su(decision making)
#2	su(medical records)
#3	su(information seeking behaviour)
#4	#1 OR #2 OR #3
#5	su(primary health care)
#6	su(general practitioner)
#7	su(physicians)
#8	su(family physician)
#9	su(family doctor)
#10	#5 OR #6 OR #7 OR #8 OR #9
#11	ft(interview)
#12	ft(focus group)
#13	#11 OR #12
#14	su(comorbidity)
#15	su(multimorbidity)
#16	ft(multi morbidity)
#17	ft(multi-morbidity)
#18	#14 OR #15 OR #16 OR #17
#19	#4 AND #10 AND #13 AND #18